



ATOP-R&D

Human Factors Newsletter # 05-13

July 9, 2005 – July 22, 2005

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Technical Note: CAMI researcher Elaine Pfleiderer prepared a paper titled "Relationship of the Aircraft Mix Index w/Power Measures and Complex Ratings".

Abstract. Aircraft mix (i.e., the mix of aircraft with different performance characteristics in a sector) has been repeatedly cited as a complexity factor in en route air traffic control. However, scant attention has been directed to a statistical examination of this relationship. The present study is the third in a series of investigations designed to define, quantify, and assess the validity of aircraft mix as a contributor to traffic complexity. Eighteen 30-minute samples of system analysis recording data were collected from the Fort Worth and Atlanta en route centers. Performance and Objective Workload Evaluation Research (POWER) measures and the Aircraft Mix Index (Pfleiderer, 2003a) were computed in six-minute intervals for each of the 36 samples. Principal Components Analysis of the combined data sets produced four components with eigenvalues >1 accounting for approximately 71% of the variance. The Aircraft Mix Index was most closely associated with Component 1, which was composed of variables generally associated with traffic complexity. These variables were used as predictors against a criterion of

controllers' subjective "Complexity" ratings in multiple regression analyses of low- and high-altitude sector samples. The Aircraft Mix Index failed to contribute significantly to the explained variance in the both the low-altitude ($R=.69$; $R^2=.47$) and high-altitude ($R=.57$; $R^2=.33$) sector models. In the aggregate, the results suggest that although aircraft mix appears to be associated with traffic complexity, it may not be as influential as other complexity factors in the en route environment.

This research activity supports the Administrator's Flight Plan Goal for Increased Safety, Objective 7: Enhance the safety of FAA's air traffic systems. The research also supports the Administrator's Flight Plan Goal for Greater Capacity, Objective 1: Increase capacity to meet projected demand.

Point of Contact: E. Pfleiderer, CAMI

Research Grant: Earlier this month, the FAA awarded a cooperative research grant to Texas Tech University to investigate how flight data is used in the current air traffic control tower cab. It assumes that flight data information can be characterized along a number of dimensions including longevity (how long the information survives), accessibility (how easily the information is obtained, relevance (how relevant to the current context is the information), benefits (the value supplied by the information), supports (what aids in maintaining the information, e.g., strips), flow (how the information moves through the system), and structure (how information co-occurs or "bundles" with other information. From these assumptions, researchers plan to conduct analytic studies (e.g., adding to existing task and job analyses) that focus on the information requirements of various controller actions. These studies will overlap in time with studies designed to look at the similarity between situations that controllers face, ending ultimately in an abbreviated simulation of one or two flight-data-intensive activities performed by tower controllers. The research team also plans two types of behavior studies. One involves observation of controllers in the field and in high-fidelity simulators. The other involves controlled behavioral studies. In particular, a focal behavioral study will require controllers to request information needed while controlling simulated air traffic. This will allow the researchers to determine exactly what information is needed, by whom, and in what situation. These studies will combine in producing a requirements document about flight data in air traffic control towers. *This research activity supports the Administrator's Flight Plan Goal for Increased Safety, Objective 7: Enhance the safety of FAA's air traffic systems. This research also supports the Administrator's Flight Plan Goal for Organizational Excellence, Objective 3: Make decisions based on reliable data to improve our overall performance and customer satisfaction.* (C. Manning, CAMI)

Job Announcement: Program Director for Human Factors

The FAA is now accepting applications for this position. The Program Director for Human Factors is responsible for leading a major agency-wide human factors program. The incumbent provides executive direction and leadership as well as executive level advice and guidance in all human factors research and development programs for the Federal Aviation Administration (FAA). The incumbent reports directly to the Director, Operations Planning Research and Development on systems acquisition issues and human factors research. Areas include: human computer interface for air traffic control, controller aircrew interface, aircrew performance,

cockpit resource management, flight training, maintenance training and procedures, medical certification of airmen, and procedures for security personnel.

Applicants should address each of the following dimensions separately describing all relevant experiences for each. Note: These leadership dimensions are part of the Administrator's Executive Workforce Planning Initiative and represent the competencies that all FAA Executives must possess. Describe your accomplishments in the following areas as they relate to this position:

- **Leadership Requirements**

1. Building Relationships: Describe how you have effectively communicated complex information to a variety of audiences, both within and outside of your organization. Explain how you have built alliances with internal and external stakeholders and how you obtained cooperation from others on difficult issues without losing their future support. Include information on how you network with others in your profession.

2. Achieving Operational Results: Describe your experience in obtaining and managing human capital, financial resources, contracts and technology for your organization. Explain how you have measured and evaluated outcomes and made improvements to the products or services in your organization.

3. Leading People: Describe your experience managing organizations and how you have incorporated diversity, dealt with conflict, and used rewards, mentoring, development or other techniques to build teamwork and cooperation.

4. Leading Strategic Change: Describe your experience in leading and managing change through vision, strategic planning, and incorporating innovative ideas and techniques, and how you have avoided or overcome obstacles.

- **Technical Requirements**

1. Knowledge of human factors scientific principles, human factors research, and human factors engineering, and the application of human factors theories, concepts and principles to systems development and major systems acquisitions.

2. Skill in delivering, designing, and/or implementing human factors services or programs to a wide variety of customers.

Basic salary is \$110,400 - \$155,300. In accordance with applicable FAA travel regulations, full relocation benefits will be paid. This position requires a secret security clearance. Some travel may be required. U.S. Citizenship is required. Applications must be received by August 10, 2005. For more information, please contact Rebecca Korelec, 202-267-3084 or by e-mail: Rebecca.Korelec@faa.gov

Technical Note: The "Credit for Instrument Rating in a Flight Training Device or Personal Computer Aviation Training Devices" research requirement is complete. The requirement's objective was to provide guidance to the Aviation Safety Program on the revision of FAR 61-141, specifying the number of credit hours for which various Flight Training Devices (FTDs) and Personal Computer Aviation Training Devices (PCATDs) may be used in lieu of actual flight. The requirement's final deliverable requested: (1) guidance as to what specific maneuvers (initial private and initial instrument training) can be completed in the FTD and/or PCATD in lieu of flight time, and (2) guidance as to whether an FTD and/or PCATD can be used for recurrent training and instrument proficiency checks in lieu of flight time. For a copy of the report, please point to: <http://www.hf.faa.gov/docs/508/docs/gaFTDfinal.pdf>
To view other general aviation reports, point to: <http://www.hf.faa.gov/gafunded.htm>

This research activity supports the Administrator's Flight Plan Goal for Increased Safety, Objective 2: Reduce the number of fatal accidents in general aviation

Point of Contact: W. Krebs, ATO-P R&D

Quarterly Reports: Third quarter reports for Aviation Maintenance, General Aviation Maintenance, and Vertical Flight are now available. Please point to:
<http://www.hf.faa.gov/hfmaint/Default.aspx?tabid=207>
<http://www.hf.faa.gov/gafunded.htm>
<http://www.hf.faa.gov/vffunded.htm>

These research activities support the Administrator's Flight Plan Goal for Increased Safety, Objectives 1 and 2: Reduce the commercial fatal accident rate; reduce the number of fatal accidents in general aviation

Point of Contact: W, Krebs, ATO-P R&D

Safety Management: CAMI representatives Dave Schroeder and Carla Hackworth participated in the Aviation Safety Management Systems (SMS) Symposium held at MITRE in McLean, VA on July 19-21, 2005. The symposium provided an in-depth look at SMS and its application to air traffic, airports, and general aviation. Dr. Hackworth was a co-author on a presentation delivered by Lance Nuckolls (AFS-800) entitled "Designated Pilot Examiner System Safety Project". *This activity supports the Administrator's Flight Plan Goal for Increased Safety, Objectives 1 and 7: Reduce the commercial fatal accident rate; Enhance the safety of FAA's air traffic systems.* (C. Hackworth, CAMI)

Researchers Leaving CAMI:

- Scott Shappell's final day at CAMI was July 22nd. He left the FAA to assume his new position as a professor in the Department of Engineering at Clemson University, Clemson, SC. Scott was the Human Factors Research Branch Manager at the Civil Aerospace Medical Institute. There he managed research programs on advanced Air Traffic Control systems, behavioral stressors, and aircrew performance.

- Bert Boquet's final day at CAMI will be July 29th. He will be leaving to assume his new position as a professor in the Human Factors Department at Embry-Riddle Aeronautical University in Daytona Beach, FL. Bert is a research psychologist at CAMI. There he is the principal investigator in the shift work, fatigue and stress program

Point of Contact: (T. McCloy, ATO-P R&D)

Electronic Flight Bags: On July 13-14, Divya Chandra and Michelle Yeh led a set of round table discussions on Volpe's Electronic Flight Bag (EFB) Usability Assessment Tools at the FAA Aircraft Certification Avionics Workshop. The tools were developed and tested by Volpe over the past two years. Researchers used "pseudo-evaluators" with aviation and/or human factors expertise as substitutes for the actual intended users, which are Aircraft Certification Specialists. This was Volpe's first opportunity to reach the real intended users (e.g., flight test pilots and engineers) to get their feedback on the tools. Three discussions were held, reaching approximately 15 certification specialists. The FAA customer (Bill Kaliardos, AIR-130) also attended the meeting. In the first discussion, attendees used the tools to evaluate a simple electronic checklist application, and then discussed their utility. The other discussions were shorter, and focused exclusively on the tools. In general, the Volpe tools were thought to be useful for the EFB evaluation process. *This activity supports the Administrator's Flight Plan Goal for Increased Safety, Objective 1: Reduce the commercial fatal accident.* (D. Chandra, M. Yeh, VNTSC)

Traffic Flow Management (TFM): Research psychologists from the William J. Hughes Technical Center's NAS Human Factors Group are briefing the TFM Modernization program office and the Traffic Management User Team on plans for a baseline study of the Traffic Situation Display (TSD). The study will be conducted on the current version of the TSD (Version 8.0) with a validation activity planned for the following release. In the future, the baseline data will be used to evaluate the modernized TFM system and ensure that it supports the users by being consistent with their mental model without increasing task load or workload. *This research activity supports the Administrator's Flight Plan Goal for Greater Capacity, Objective 3: Increase on-time performance of scheduled air carriers.* (E. Stein, WJHTC)

More information on human factors research can be found at the FAA Human Factors (ATOP-R&D) web site: <http://www.hf.faa.gov>

Paul Krois
FAA (ATO-P R&D Human Factors)



July 22-28, 2005 – HCI International 2005, 11th International Conference on Human-Computer Interaction, Caesars Palace, Las Vegas, NV hci2005@ecn.purdue.edu

July 25-31, 2005 – EAA AirVenture Oshkosh 2005, Oshkosh, WI <http://www.airventure.org>

August 15-18, 2005 - 43rd AIAA Aerospace Sciences Meeting and Exhibit, Hyatt Regency San Francisco at Embarcadero Center, San Francisco, CA <http://www.aiaa.org/>

August 18-21, 2005 - 113th Convention of the American Psychological Association, Wash, DC <http://www.apa.org/convention>

August 22-26, 2005 – SAE G-10 (Behavioral Engineering Technology Committee Meeting, Washington, DC http://forums.sae.org/access/dispatch.cgi/TEAG10_pf

August 29 – September 1, 2005 – ATO Leadership Summit, Washington, DC

August 30 - September 2, 2005 - Measuring Behavior 2005, 5th International Conference on Methods and Techniques in Behavioral Research, Wageningen, The Netherlands
www.noldus.com/mb2005

September 5-9, 2005 – HCI 2005, Edinburgh, UK <http://www.bcs-hci.org.uk/hci2005/>

September 11-15, 2005 – International Conference on Fatigue Management in Transportation Operations, Seattle, WA <http://scitech.dot.gov/research/human/>

September 12-16, 2005 – Interact 2005, Tenth IFIP TC13 International Conference on Human-Computer Interaction, Rome, Italy <http://www.interact2005.org/>

September 13-14, 2005 – Third ICAO-IATA LOSA TEM Conference, Kuala Lumpur, Malaysia
DMaurino@icao.int

September 15-18, 2005 - Conjoint Meeting of the Australasian Society of Aerospace Medicine and the Asia Pacific Federation of Aerospace Medical Association, Gold Coast, Queensland, Australia. www.asam.org.au.

September 19-23, 2005 – ANA 2005 Aviation Conference and Exhibition, Connecticut Convention Center, Hartford. CN <http://www.aerospace-na.com/ace2005.asp>

September 20-21, 2005 - R,E&D Advisory Committee Meeting (joint meeting with NASA's Aerospace Research Advisory Committee), Bessie Coleman Auditorium, FAA Headquarters, Wash., DC Gloria.dunderman@faa.gov

September 20-22, 2005 – Second Safety Across High-Consequence Industries Conference, Saint Louis University, St. Louis, MO http://parks.slu.edu/msasm_conference/index.html.

September 20-24, 2005 - 1st Congress of the International Society for Cultural and Activity Research (ISCAR), Seville, Spain iscar2005@iscar.org

September 21-23, 2005 - Cargo Facts 2005- 11th Annual Aircraft Symposium, Sheraton Hotel & Towers, Seattle, Washington ashoemaker@cargofacts.com

September 25-28, 2005 - 11th Ka and Broadband Communications Conference and 23rd AIAA International Communications Satellite Systems Conference 2005 (organized by IIC), Aurelia Convention Center, Rome, Italy <http://www.aiaa.org/>

September 26-28, 2005 - AIAA 5th Aviation, Technology, Integration, and Operations Forum (ATIO), Hyatt Regency Crystal City, Arlington, VA <http://www.aiaa.org/>

September 26-28, 2005 - AIAA 2nd Intelligent Systems Conference (IS), Hyatt Regency Crystal City, Arlington, VA <http://www.aiaa.org/>

September 26-30, 2005 – Human Factors and Ergonomics Society 49th Annual Meeting, Royal Pacific Resort at Universal Orlando, Orlando, FL <http://hfes.org/meetings/menu.html>

October 3-6, 2005 – SAE 2005 AeroTech Congress and Exhibition, Gaylord Texan Resort and Convention Center, Dallas/Fort Worth Airport Area, Texas
<http://www.sae.org/events/conferences/aerospace/>

October 6-9, 2005 – Aviation North Expo Conference, Fairbanks Princess Riverside Lodge, Fairbanks, AK www.AviationNorth.org

October 9-11, 2005 – Aviation Maintenance Star Symposium, Ritz-Carlton, Phoenix, AZ
www.STARSymposium.com

October 20-21, 2005 – 2nd Annual FAA International Safety Forum, Westfields Marriott, Chantilly, VA <http://www.faa.gov/news/conferences/safetyforum/index.cfm?topic=6>.

October 22-26, 2005 – American Medical Informatics Association Annual Symposium, Hilton Washington, Wash, DC <http://www.amia.org/meetings/annual/current/>

October 23-26, 2005 - UIST 2005, Eighteenth Annual ACM Symposium on User Interface Software and Technology, Seattle, WA <http://www.acm.org/uist/index.html>

October 24-25, 2005 – National Academies Institute of Medicine Annual Meeting, National Academy of Sciences, Washington, DC <http://wwwsearch.nationalacademies.org/>

October 24-26, 2005 – 43rd SAFE Symposium, Grand America Hotel, Salt Lake City, UT
<http://www.safeassociation.org/symposium.htm>

October 26-28, 2005 – Air Cargo Americas, Radisson Centre, Miami, FL
www.aircargoamericas.com

October 27-28, 2005 - Second International Conference on Knowledge Management ICKM2005 Westin Charlotte, Charlotte, NC <http://www.asis.org/ICKMcall.htm>

October 30–November 7, 2005 – ATCA 50th Annual Conference and Exposition, Dallas, TX
http://www.atca.org/event_items.asp.

October 30—November 3, 2005 – 24th Digital Avionics Systems Conference, Hyatt Regency Crystal City, Wash., DC <http://www.dasconline.org>

November, 2005 – DoD TAG (Human Factors Engineering Technical Advisory Group) Meeting, Baltimore, MD <http://hfetag.dtic.mil/meetschl.html>

November 3-5, 2005 - AOPA Expo, Tampa, Florida www.aopa.org

November 3-5, 2005 - Conference on Designing for User Experience, Fort Mason, San Francisco, CA <http://www.dux2005.org/>

November 6-9, 2005 - ACI World / Pacific Conference and Exhibition, Auckland, New Zealand.
www.auckland-airport.co.nz

November 7-9, 2005 – DoD TAG, Baltimore, MD <http://hfetag.dtic.mil/meetschl.html>

November 7-10, 2005 – Flight Safety Foundation 58th Annual International Air Safety Seminar, Moscow, Russia http://www.flightsafety.org/iass05_cfp.html

November 7-10, 2005 - Ergonomics and Human Factors: Applications in Occupational Safety and Health, Harvard School of Public Health, Cambridge, MA
<http://www.hsph.harvard.edu/ccpe/programs/EHF.shtml>

November 8-10, 2005 – Aerospace Testing Expo, North America: Scientific Conference and Technology Forum, Long Beach Convention Center, Long Beach, CA
<http://www.aerospacetesting-expo.com/northamerica/conf+forum.html>

November 8-10, 2005 – Maintenance, Repair & Overhaul Exhibition Asia, Suntec Convention Center, Singapore <http://www.aviationnow.com/conferences/masmain.htm>

November 10, 2005 - 34th Annual Meeting of the Society for Computers in Psychology, Toronto, Ontario, Canada <http://www.scip.ws>

November 10 - 13, 2005 - 46th Psychonomic Society Annual Meeting, Toronto, Ontario, Canada <http://www.psychonomic.org/meet.htm>

November 15-17, 2005 - National Business Aviation Association's 58th Annual Meeting & Convention, New Orleans, LA www.nbaa.org

November 16-17, 2005 – IEE Human Factors Engineering Professional Network/MoD Human Factors Integration Defense Technology Center “People and Systems Symposium: Who Are We Designing For?”, Grange City Hotel London, UK <http://conferences.iee.org/pas2005>

January 9-12, 2006 - 44th AIAA Aerospace Sciences Meeting and Exhibit, Reno Hilton, Reno, NV <http://www.aiaa.org/>

January 22-26, 2006 – TRB 85th Annual Meeting, Washington, DC <http://trb.org/calendar/>

March 13-15, 2006 – Flight Safety Foundation 18th Annual European Aviation Safety Seminar, Athens, Greece <http://www.flightsafety.org/seminars.html#eass>

March 20-23, 2006 – 16th Annual AAMI/FDA International Conference on Medical Device Standards and Regulation, Hyatt Regency, Reston, VA
<http://www.aami.org/meetings/isc/index.html>

March 22 - 25, 2006 - Society for Behavioral Medicine Annual Meeting and Scientific Sessions, San Francisco, CA www.sbm.org/annualmeeting/index.html

March 23-25, 2006 - 17th Annual International Women in Aviation Conference, Opryland Hotel Nashville, TN <http://www.wai.org/>

March 23-27, 2005 – IA Summit 2006, Hyatt Regency, Vancouver, BC, Canada
<http://www.iasummit.org/>

April 4-10, 2006 – Sun ‘n Fun, Lakeland, FL <http://www.sun-n-fun.org/content/>

April 6-7, 2006 – National Human Capital Summit, Chicago Marriott Downtown, Chicago, IL
http://www.humancapitalinstitute.net/conference_national.html

April 22-27, 2006 – CHI 2006, Montreal, Quebec, Canada
<http://www.chi2006.org/call/hcioverviews.php>

April 25-27, 2006 – Maintenance, Repair & Overhaul (MRO) Conference & Exhibition, Phoenix Civic Plaza, Phoenix, AZ <http://www.aviationnow.com/conferences/mromain.htm>

May 1-4, 2006 - 47th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference; 14th AIAA/ASME/AHS Adaptive Structures Conference; 7th AIAA Gossamer Spacecraft Forum; 2nd AIAA Multidisciplinary Design Optimization Specialist Conference; 1st AIAA Non-Deterministic Approaches Conference, Hyatt Regency Newport, Newport, RI <http://www.aiaa.org/>

May 9-11, 2006 – Flight Safety Foundation 51st Annual Corporate Aviation Safety Seminar, Phoenix, AZ <http://www.flightsafety.org/seminars.html#eass>

May 14-18, 2006 - 77th Annual Scientific Meeting of the Aerospace Medical Association, Caribe Royale Hotel, Orlando, FL <http://www.asma.org/>

May 25-28, 2006 – American Psychological Society 18th Annual Convention, New York Marriott Marquis, New York City, NY <http://www.psychologicalscience.org/convention/>

June 11-14, 2006 – The American Society of Safety Engineers Safety 2006 Conference, Washington State Convention and Trade Center, Seattle, WA
<http://www.asse.org/2006pdcallforpapers.pdf>

June 24-26, 2006 – AAMI Conference & Exposition, Wash, DC
<http://www.aami.org/proposals/index.html>

July, 2006 - 26th International Congress of Applied Psychology, Athens, Greece
dgeorgas@dp.uoa.gr ,
http://www.erasmus.gr/dynamic/conventions.asp?conv_id=21r/dynamic/conventions.asp?conv_id=21

July 24-30, 2006 – EAA AirVenture, Oshkosh, WI <http://www.airventure.org/>

August 10-13, 2006 – American Psychological Association Annual Meeting, New Orleans, LA
<http://www.apa.org/convention05/future.html>

September 10-14, 2006 - 54th International Congress of Aviation and Space Medicine, Bangalore, India. A preliminary registration form may be found at <http://www.isam-india.org/conference44/newreg.php>.

October 23-25, 2006 – 44th Annual SAFE Symposium, Reno Hilton Hotel, Reno, NV
<http://www.safeassociation.org/symposium.htm>

Note: Calendar events in Italics are new since the last Newsletter



Comments or questions regarding this newsletter?
Please contact Bill Berger at (334) 271-2928
or via e-mail at bill.ctr.berger@faa.gov

